Space Weather Forecast

Issued on Sunday, 20 February 2022 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor Geomagnetic Storms likely day 1 or 2 (20th/21st)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, due to a common class flare from a likely sunspot region that is currently hidden from view, but expected to soon rotate onto the disc, most likely day 2 (21st). This was the likely source of a large flare and coronal mass ejection on the far side on the 15th. There are currently three sunspot groups on the visible disc, which are small and relatively stable. No Earth-directed Coronal Mass Ejections (CMEs) were in evidence in available satellite imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind erratically rose from background to be slightly elevated at the end of the period. This was accompanied by the magnetic field of the wind becoming moderately strong. This was also often pointed in a southward direction in the important north-south component. This was likely due to the arrival of the a region of solar wind ahead of an expected faster solar wind regime, originating from a coronal hole. Despite this, geomagnetic activity remained Quiet to Unsettled (Kp 2-3), below geomagnetic storm levels (Kp5)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained very slightly above background levels, but gradually declining and well below the threshold for solar radiation storms. This was due to the large flare from the region expected to rotate into view in the coming days.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low or Very Low at first, but with a slight chance of rising to Moderate due to the potential for flaring from the notable region expected to rotate onto the Earth-facing disc day 2 (21st). The three sunspot regions on the Earth-facing disc are currently unlikely to produce significant flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Earth is likely in the CIR ahead of the fast wind of CH55/-, and expected to move into the fast wind day 1 (20th). A further enhancement is then likely day 2 (21st) from the arrival of the fast wind of CH56/+, with fast winds perhaps persisting day 3 (22nd) before easing day 4 (23rd). Geomagnetic activity is forecast to become Unsettled to Active day 1 and day 2 (20th to 21st), with G1 Minor Storm intervals likely. Otherwise, mainly Quiet to Unsettled, with only a chance of Active intervals day 3 (22nd).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to soon fall to background, with no solar radiation storms expected through the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	40	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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